

## ***In silico* metabolic engineering: from research to the market**

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The emergence of industrial biotechnology in the last years has created the need to accelerate the tasks of strain development, as most strains have naturally evolved for growth and not for the production of desired compounds. Moreover, in many cases, microbial strains are being used to produce compounds that are not native to their metabolism, requiring the addition of heterologous genes.

Thus, concurrently with fast and novel developments in molecular biology, there has been a significant investment in modelling and computational tools to aid rational strain design efforts. In our research group, we have been involved in several projects where relevant tools have been developed such as the user-friendly, widely used software tool OptFlux [1]. More recently, we have also launched the merlin tool [2] for aiding in genome-scale model reconstruction processes.

Based on the knowledge accumulated in the *in silico* metabolic engineering field, the spinoff company SilicoLife was launched in 2010 to answer some market needs that could not have been addressed through the University. SilicoLife is now a fully independent company specialized in designing *in silico* metabolic engineering solutions for industrial biotechnology, having projects with some of the major players in the field worldwide, both from industry and academia. SilicoLife has several proprietary technologies, from a pipeline for microbial model reconstruction to tools that aid the identification of non-trivial interventions such as gene knockouts and over/underexpressions for re-directing the metabolic fluxes to the desired target.

### References

- [1] Rocha, I; Maia, P; Evangelista, P; Vilaça, P; Soares, S; Pinto, JP; Nielsen, J; Patil, KR; Ferreira, EC; Rocha, M. OptFlux: an open-source software platform for *in silico* metabolic engineering. *BMC Systems Biology*, 4(45), 1-12, 2010
- [2] Dias, O; Rocha, M; Ferreira, EC; Rocha, I. Reconstructing genome-scale metabolic models with merlin. *Nucleic Acids Research*, 43(8), 3899-3910, 2015.